

ISLE ROYALE BEAVER STUDY -- 1996

Douglas W. Smith
Yellowstone Center for Resources
P.O. Box 168
Yellowstone National Park, WY 82190

Summary: The number of active beaver (*Castor canadensis*) colonies in Isle Royale National Park was determined by aerial census 24 - 26 October 1996. This is the twelfth population count in a series of surveys begun by Philip Shelton in 1962. Approximate flying time of the census was 8.7 hours, plus 3.4 hours ferry time from Minnesota for a total flying time of 12.1 hours. Total number of beaver colonies with food caches was 128, and 15 other sites had beaver sign (fresh cutting or mud on lodge) for a total of 143 active sites. This was the same number of active sites as in 1994, but a decline (- 7%) in colonies with food caches compared to the 1994 census. Colonies in all habitats (stream, lake, harbor, and 1936 burn) declined slightly, except that there was an increase in harbor colonies.

INTRODUCTION

This was the twelfth beaver population count in Isle Royale National Park history (Shelton 1966). This total represents the most for any National Park. Beaver colonies peaked on Isle Royale in 1974, after which time they declined, then increased again but not to their 1974 level. Since 1986 beaver colonies have been slowly declining probably in response to habitat exhaustion (Smith 1992).

METHODS

I spotted active beaver colonies from small fixed wing aircraft (Husky) from an altitude of approximately 600 feet and an air speed of 85 - 100 mph. The island was surveyed in overlapping parallel strips. In areas of high beaver density, repeated overflights with much circling were often necessary. The primary indicator of beaver activity was a fresh food cache, but this alone was not used to identify active sites. A colony was not called active until other signs of beaver use were identified: freshly peeled sticks, newly cut trees, fresh mud on beaver lodge, or a recently repaired dam (Hay 1958, Shelton 1966, Payne 1981, Brown and Parsons 1982, Swenson et al. 1983). Active colonies were marked directly onto a 1:62,500 scale topographic map. This map is on file in the Natural Resource Management office at Isle Royale National Park.

The survey was conducted from 24 - 26 October, and observation conditions were excellent. All deciduous trees had

shed their leaves and skies were mostly overcast (some sunshine otherwise) throughout the survey making for near perfect conditions for viewing hard to spot colonies. I began the survey in a fashion similar to other surveys since 1992, beginning at the west end of the island working northeast. I used the same survey counting sections established by Shelton (Shelton 1966, Smith and Shelton 1991).

RESULTS

The total number of active colonies with food cache and fresh sign was 128, and 15 additional sites of beaver activity were observed that did not have caches (Table 1). Using Shelton's (1966) figure for average number of beavers per colony (6.4 beavers for colonies with a cache, 2 beavers for sites with sign) the total number of beavers on Isle Royale was approximately 849 ($819 + 30$). This is a 5% decline in estimated beaver numbers since 1994, and a 7% decline in colonies with a food cache.

Forty-eight percent of all active beaver colonies were north of the Greenstone ridge, a 28% decline since 1994. Eleven colonies were recorded on the southwestern quarter of the island, a 55% increase. Beaver densities were again highest on the northeastern section of the island, especially north of Mount Siskiwit and in the areas of Sargent, Angleworm, and Benson lakes. Densities in the upper reaches of Washington Creek declined slightly.

Harbor colonies increased from 1 in 1994 to 5 in 1996, a 400% increase. Two colonies were active on Passage Island and in Duncan Bay, and one other harbor colony was located in Hay Bay.

Beaver colonies on the large lakes declined from 22 in 1994 to 19 in 1996, a decline of 14%. No colonies were located on Chickenbone, Hatchet or Ojibway lakes, places typical to beaver occupation in past surveys. Sargent Lake had two colonies in 1996, a 50% decline since 1994. Harvey, Lesage, Patterson, Richie, and Siskiwit had the same number of colonies in 1996 as in 1994, and Angleworm, Benson, and Intermediate lakes all had more colonies compared to 1994.

Beaver colonies in the 1936 burn declined from 48 to 43 in 1996, a 10% decline.

No ground reconnaissance occurred in 1996 so descriptions of habitat conditions are not available.

DISCUSSION

The number of active beaver colonies in Isle Royale National Park declined for the fifth consecutive survey (Smith and Shelton

1991, Smith 1992, 1994). Active colonies with a food cache declined by 7%, within the range predicted by Smith (1994). If sites with a food cache and fresh sign are considered together, then the beaver population has been stable between 1994 and 1996. It is likely that the beaver population did decline between 1994 and 1996 because the survey in 1994 was done with most of the deciduous leaves on the trees (9 - 11 October), which probably restricted visibility and turned up fewer sites with fresh sign. Sites with fresh sign found in 1994 were the lowest ever recorded lending support to the idea that this segment of the beaver population (singles and pairs) was underestimated. The near perfect censusing conditions in 1996 then was not comparable to 1994 suggesting that beavers have decreased in 1996.

The beaver population on Isle Royale should continue to slowly decline as habitat conditions continue to deteriorate for beavers. Some event to replenish aspen and birch, like fire, near lakes and streams would need to occur before beavers are to increase in numbers. It is also likely that the current wolf situation on the island will not be conducive to beaver population growth. The moose population crash of 1995-1997, in which moose numbers dropped from 2400 to 500, has meant severe food shortages for wolves (R. Peterson personal communication), which will probably increase the predation pressure on beavers, even in winter. This wolf predation acting in concert with declining beaver habitat will probably drive the beaver population downward, possibly at a rate higher than 5 - 10% between aerial population surveys (which occur every two years; Smith 1994,).

Beaver colonies decreased on the inland lakes, but only by three colonies (14%). Colonies on lakes have been remarkably stable since 1962, and this year's count was near the 34 year average of 23. I expect total number of lake colonies park-wide to remain stable as beavers have a larger area to forage on large lakes, and many lakes have ample supplies of beaked hazel, a shrub that will support beavers. Most notable for the 1996 survey was the absence of colonies on Chickenbone and Hatchet lakes. These lakes are located in high density beaver areas and typically support at least one colony. One Hatchet Lake colony has been intermittantly active at the same location since 1962. Beavers on both lakes have migrated upstream from the lakes, and over the years, will probably reoccupy these lakes.

Harbor

In the 1994 beaver report, Smith (1994) predicted that despite research correlating beaver occupation with younger aged forests (Jenkins and Busher 1979, Novak 1987), beavers would persist for longer periods on segments of Isle Royale where there was mature forest. The prediction stated that these older, uneven-aged stands have more forage diversity, especially shrubs,

than areas where 1936 burn birch predominated. Smith (1994) stated that this prediction was testable through long-term beaver population surveys. In 1996, 1936 burn beaver colonies declined for the fourth survey (1990 - 1996 colonies declined in burn) while areas of mature forest on the northeastern end of Isle Royale continued to support the densest beaver population. The beaver population increased on the southwestern portion of the island, an area of historical low density, in areas not burned by the 1936 fire. Hence through one additional survey this prediction is supported.

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Table 1. Aerial counts of beaver colonies, Isle Royale National Park, 1962-1996. Number in parenthesis is percentage of colonies in that habitat. Fresh sign represents either a lodge with fresh sign and no food cache, or beaver cutting; these were not considered part of the total which is colonies with food caches. Stream, lake, and harbor sites sum to 100%.

Year	Total	Stream	Lake	Harbor	1936 burn	Fresh sign	Total active sites
1962	125	84 (67)	26 (21)	15 (12)	43 (34)	-	-
1974	286	251 (88)	24 (8)	11 (4)	102 (36)	30	316
1978	129	99 (77)	19 (15)	11 (8)	48 (37)	27	156
1980	83	58 (70)	17 (20)	8 (10)	13 (16)	39	122
1982	125	93 (74)	24 (19)	8 (6)	31 (25)	28	153
1984	151	129 (85)	17 (11)	5 (3)	53 (35)	53	204
1986	204	167 (82)	26 (13)	11 (5)	75 (37)	36	240
1988	200	164 (82)	30 (15)	6 (3)	81 (40)	40	240
1990	176	146 (83)	28 (16)	2 (1)	74 (42)	33	209
1992	137	116 (85)	21 (15)	0 (0)	55 (40)	23	160
1994	137	114 (83)	22 (16)	1 (1)	48 (35)	6	143
1996	128	104 (81)	19 (15)	5 (4)	43 (34)	15	143

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FIGURE LEGENDS

Figure 1. Number of active beaver colonies in Isle Royale National Park 1962 - 1996.

